

What is claimed is:

1. A method for fabricating a CMOS image sensor having a plurality of unit pixels, comprising:

5 a) providing a semiconductor structure having a photodiode on a semiconductor substrate;

b) forming an insulating layer covering the semiconductor structure including the photodiode;

10 c) forming a dielectric layer having hydrogen over the insulating layer;

d) diffusing hydrogen ions from the dielectric layer into the photodiode; and

e) removing the dielectric layer.

15 2. The method as recited in claim 1, wherein the step of forming a dielectric layer includes forming it with a material selected from a group consisting of silicon oxide ( $\text{SiO}_x$ ), silicon nitride ( $\text{SiN}_x$ ), silicon oxide nitride ( $\text{SiO}_x\text{N}_y$ ) and  $\text{Si}_3\text{N}_4$ .

20 3. The method as recited in claim 2, wherein the step of forming a dielectric layer includes plasma enhanced chemical vapor deposition (PECVD).

25 4. The method as recited in claim 1, wherein the step of diffusing hydrogen ions includes thermal treatment.

5. The method as recited in claim 1, wherein the step of removing the dielectric layer includes dry etching or wet etching.

5 6. The method as recited in claim 1, wherein the step of forming a dielectric layer includes depositing it to a thickness of 7000 Å to 8000 Å.

10 7. The method as recited in claim 1, wherein the step of forming a dielectric layer includes forming it only on an upper portion of the photodiode.